

invention comprises a step of forming a mixed powder of silicon carbide powder having an average grain diameter in a range of 0.1 to 10 μm and carbon powder having an average grain diameter in a range of 0.005 to 1 μm into a compact having a desired shape;
5 a step of producing a sintered body of the silicon carbide matrix composite material by heating the compact to a temperature of the melting point or more of silicon and also impregnating molten silicon into the compact; and a step of fabricating the surface of the sintered body to provide a part having the final size.

10 [0018] A second process for producing a part of a silicon carbide matrix composite material according to the present invention comprises a step of forming a mixed powder of silicon carbide powder and carbon powder into a preliminary compact having a size larger than the final size; a step of processing at least a part of the
15 preliminary compact into a compact having a size smaller than that of the preliminary compact but larger than the final size; a step of producing a sintered body of the silicon carbide matrix composite material by heating the compact to a temperature of the melting point or more of silicon and also impregnating molten silicon into
20 the compact; and a step of fabricating the surface of the sintered body to provide a part having the final size.

[0019] According to the first and second processes for producing the part of the silicon carbide matrix composite materials of the present invention, various parts having a complex shape and a large
25 size can be produced inexpensively from the silicon carbide matrix composite material excelling in strength and toughness.

Specifically, when the sintered body is produced from the compact according to the present invention, the shrinkage is very small,

melting point or more of silicon and also impregnating molten silicon into the compact; and

fabricating the surface of the sintered body to provide a part having the final size.

5 16. A process for producing a part of a silicon carbide matrix composite material, comprising:

forming a mixed powder of silicon carbide powder and carbon powder into a preliminary compact having a size larger than the final size;

10 processing at least a part of the preliminary compact into a compact having a size smaller than that of the preliminary compact but larger than the final size;

producing a sintered body of the silicon carbide matrix composite material by heating the compact to a temperature of the
15 melting point or more of silicon and also impregnating molten silicon into the compact; and

fabricating the surface of the sintered body to provide a part having the final size.

20 17. The process for producing a part of a silicon carbide matrix composite material according to claim 16, wherein the compact is produced to be larger than the final size by a range of 10% or less.

25 18. The process for producing a part of a silicon carbide matrix composite material according to claim 16, wherein the compact is produced to be larger than the final size by a range of 5% or less when the compact has a size exceeding 200 mm.

19. A process for producing a part of a silicon carbide matrix composite material by bonding plural part units formed of